

ON TWO NEW SPECIES OF MACROTRACHELOUS CALLIDINÆ.

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(Read January 20th, 1893.)

(PLATE XI.)

Before entering upon the description of the new forms, I take this opportunity of referring to two points as to which some misconception may exist. The first arises in part from an error of my own. In my former paper on the group of Macrotracheous Callidinæ I mentioned a species, which is not uncommon, as "the form described by Mr. Milne as the *Callidina elegans* of Ehrenberg." I should have referred to it simply as the *Macrotrachela elegans* of Milne, for, in point of fact, that author, as I have more recently stated, had come to the conclusion that Ehrenberg's genus *Callidina* represented *Philodinæa*, having that type of corona which we now recognize as distinctive of the genus *Adineta*. It follows from this that his two species, *M. elegans* and *M. bidens*, were believed by him to be distinct from the two species of *Callidina* described previously under the same specific names. Yet Dr. Hudson, regarding all the *Macrotrachelæ* of Milne as so many species of *Callidina* (*Rotif. Supp.*, p. 59), proceeds (*Index, ibid.*, p. 64) to refer *M. elegans* to the *Callidina elegans* of Ehrenberg, and *M. bidens* to the *Callidina bidens* of Gosse, being obviously misled by Mr. Milne's unfortunate choice of names. Having compared the descriptions given in "The Rotifera" (i., p. 109) with those furnished by Mr. Milne, and having found forms agreeing with both of the latter, I have little doubt that all four species are distinct, and I would suggest that Mr. Milne should remove the present block by bestowing new names upon his forms. I venture to add, as my own opinion, that the fact that a specific name has been already employed should be a supreme objection to its use for a new form of any conceivable propinquity of

relationship, however suitable that name should otherwise appear.

The second point is the use by Dr. Hudson of the term œsophagus in the specific characters given (Supp., pp. 9-10) for *Callidina symbiotica* and *C. Leitgebii*. The former he states to possess an "œsophagus without a loop," the latter, an "œsophagus with a loop." The portion, however, of the alimentary tract where the loop is present in *C. Leitgebii*, is that between the mouth cavity and the mastax, and is better identified as the buccal funnel, gullet, or pharyngeal tube, whereas the œsophagus is that portion following the mastax, and through which the food is conducted in its passage from the mastax to the stomach. As Dr. Hudson himself (Rotifera, i., p. 7) has defined it in this sense, his use of it to denote the pharyngeal tube is clearly a slip.

Callidina symbiotica, therefore, has the pharyngeal tube without a loop, and *C. Leitgebii* has the pharyngeal tube with a loop. So far as I am aware the loop occurs in no other species of the genus.

The occurrence of two more specimens of *Callidina spinosa* enables me to add to my former description of that species that the rami have respectively three and two teeth, giving the formula $\frac{3}{2}$, and that the species is viviparous. The latter character, although possessed by several of the commensal Callidinæ, has not yet been noted among the macrotrachelous group, and the doubt is thereby raised as to whether the species is not in reality a Philodina, in which the eyes have escaped detection. I hope, therefore, that whoever may next find it will look closely for the eyes, for the number of toes, and for the presence of a foetus. In Philodina the eyes are frequently very difficult to see, from the paleness of the colouring matter; and as this species has a very rough and opaque skin, it is the more possible that they may have escaped my search.

The two new species exhibit extreme departures from the type of ciliary organs normal among the Philodinadæ. For my present purpose that type may be said to consist of two ciliary wreaths, of which the principal is borne round about the peripheries of the dilated and cushion-like tops of two prominent fleshy lobes, placed side by side, and separated by a conspicuous gap. In a directly dorsal view, one observes at the outer lateral bases of

these lobes a collar-like ridge, the dorsal continuation of the margin of the mouth. By measuring the greatest breadth, across the two fully expanded lobes, and again at the edge of this collar, we can classify, with some accuracy, the varying proportions of the ciliary organs.

In *Philodina* the two discs are usually much wider than the collar, but as we examine the *Callidinæ* we find a series of gradations passing from the broad *Philodina*-like discs of *quadricornifera* and other large forms until we reach, in this new species, *Callidina pusilla*, a form in which the discs are barely one-half the breadth of the lip margin. It is no longer the collar which we can measure, we have to take our dimension from side to side of the lip itself. The conspicuous gap between the lobes has disappeared, and there remains but a shallow notch, merging into a shallower groove, to mark the two-fold structure of the almost united discs. The cilia of the principal wreath no longer produce the appearance of a revolving cog-wheel, but rather that of so many lashes, whose free ends are rapidly and independently whirling in circles as though swung round from their respective bases, an appearance probably as illusory as the other. They give the impression of being rather longer and more vigorous, if possible, than usual, as though to compensate for their presumably smaller number. I have not observed the animal attempt to swim, but these cilia, at all events, have no difficulty in fulfilling their important duty of drawing food particles within reach of the secondary wreath. In consequence of the reduced proportions of the discs, and the retained height of their pedicels, the secondary wreath is placed, as to the principal wreath, at a much more oblique angle than is normal. The species which approaches this most nearly in its restricted disc surface is *C. reclusa*, one of the two interesting species found dwelling in the cells of *Sphagnum*, and it is curious to note that *pusilla* is also a tube-dweller; indeed, it was this species which I referred to in my earlier paper as a tube-dwelling species, which I could not identify.

Recently, however, I have succeeded in establishing a colony in a trough whose sides have become coated with a growth of some very minute alga. Here and there specimens of *pusilla* have formed little tubes, distinguishable by their brown colour from their floccose-like surroundings. It is almost a

euphemism to call these habitations tubes, but in the larger examples there does appear to be an elastic tissue forming the basis of the structure. Externally it is rough, as though coated with and formed by particles brought together by the action of the wheels. I have not, however, observed any movement of the Rotifer suggestive of conscious tube-building, nor have I seen the manner of the disposal of the fæces, which I have thought might perhaps be the cause of the brownish colour of the tube. Individuals without a sheltering tube are occasionally seen nestling among the flocculent growth, but I believe that these are either very young specimens or such as have been recently disturbed or otherwise induced to leave their habitations. Deserted tubes are not infrequent, but are usually small, and often contain a single egg.

My colony has existed for some three months, and, whilst the increase in numbers has been slow, it has been maintained. Yet it has been far outstripped by that of *C. constricta*, a more nomadic form, which has been its table companion in captivity. This suggests that *pusilla* is less hardy, or is less prolific, or that its eggs develop more slowly than those of its competitor, whose eggs, indeed, are deposited wherever the parent may happen to be, and left quite unprotected. The smaller size of *pusilla* and its smaller trochal discs do not, I think, account for the difference, for in the same trough I have several other larger forms with spreading trochal discs, and none of these show any increase at all. *C. pusilla* has one structural peculiarity occurring in several other species, but not mentioned by any other writer than Dr. Zelinka, who has noted its presence in *C. symbiotica*. This is a peculiar hillock-like swelling upon the dorsal surface of the first joint of the foot, arising apparently from a local thickening of the hypodermis. Longer than broad, and placed lengthwise to the body-axis and in the central line, it is best seen in lateral view, when it appears as a low mound rising gently in the front and extending nearly to the hinder boundary of the joint, where it terminates rather abruptly.

In the second new species the trochal discs have become developed into two horn-like processes, which extend forwards, and are so curved as to suggest at once the head of the male of the stag beetle. I propose for it the name of *cornigera*. There have been no forms discovered intermediate between this very

abrupt departure and the type, and I anticipate that ultimately a new genus must be created to receive this species. But I have only found one single specimen, and although I kept it for some fourteen days I failed to get any precise observations of the disposition of its ciliary wreaths. The creature was very timid and sluggish, and on the few occasions I saw the wheels protruded it baffled my efforts by either erecting itself until one could see into the mouth, or leaving hold it would swim away to be presently stopped by coming full tilt against some obstacle. Over and over again it was brought to a stop with its horns against the glass forming the bottom of the cell, and there it would continue for some minutes, the wheels in motion and the foot waving directly in the line of sight. Thus standing either upon its foot or upon its head it constantly frustrated my designs, and I could only obtain approximate sketches and cursory notes.

The lateral edges of the discs are produced forward as two horn-like processes, which at first receding from each other are yet so curved that towards the tips they have begun to approach and do approach as closely as at their bases. For some three-fourths of their length they advance almost in the plane of the body, but from thence they are decurved till they point nearly at right angles to their original plane. I could see no gap between the two halves of the cilia-bearing surface, nor any break in the line of cilia, or in the line of the discs. That portion which most nearly corresponded to the usual trochal discs was here replaced by a somewhat concave surface, the upper margin showing in dorsal view as an approximately straight line joining the bases of the horns. The concavity of this surface seemed to be continued some little way forward along the inner side of the horns, and, as well as I could see, the cilia of the principal wreath were disposed along the whole dorsal margin of the concavity, and, at least, a great portion of the ventral, extending thus not merely across the front, but even some little distance along the inner margins of the horns on either side. I could not define any portion of the secondary wreath nor the form of the mouth cavity. In the act of protruding the wheels one horn was pushed forth before the other, as though in retraction it had been folded across and outside it, both being bent inwards from their bases.

Whenever the wheels were withdrawn there became visible the familiar outline of a *Callidina*, a little stouter than some forms, but not now presenting any obvious peculiarities.

I noticed that the double flap, terminating the column tip, was rather more developed than usual, but the cilia beneath it were not particularly powerful or conspicuous. The dorsal surface of the column had a perceptible thickening of the hypodermis very noticeable in side view.

The third segment, to which belong the mouth and the trochal discs, seemed a little bulkier than is usual, and the next carried a very short antenna, about one-fourth of the neck thickness.

There were the usual skin-folds, dorsal and lateral, lightly marked, whilst the foot had the ordinary short conical spurs. I did not ascertain the mastax formula.

Callidina pusilla, n. sp.

Sp. Ch.—Small, rather slender, trochal discs, about one-half breadth of mouth margin, sulcus reduced to shallow notch, discs on pedicels rather higher than breadth of discs. Mastax formula $\frac{4}{3}$, food in pellets, digestive action a periodic heaving of stomach, upper joint of foot with mound-like swelling. Spurs, two short cones. Inhabits brownish, rough-looking tubes.

Habitat.—Moss from Epping Forest.

Length.—Largest specimens about $\frac{1}{10}$ th inch, extended.

Callidina cornigera, n. sp.

Sp. Ch.—Trochal discs apparently without gap, laterally produced into two horn-like but fleshy processes, whose bases are furnished on inner face with cilia, forming part of principal wreath. Antenna very short, one-fourth of neck-thickness.

Habitat.—Moss from roadside, near Bognor.

Length.—Extended about $\frac{1}{10}$ th inch.

DESCRIPTION OF PLATE.

Fig. 2.—*Callidina pusilla*, wheels protruded, ventral view.

„ 2a.— „ „ wheels protruded, lateral view, in tube.

„ 3.—*Callidina cornigera*, wheels protruded, dorsal view.

„ 3a.— „ „ lateral view of horns.

„ 3b.—Column as extended in crawling.